PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Ken Hanscom	)
Serial No:	09/930,120	) Art Unit 3654
Filed:	August 14, 2001	)
For:	TAPE GUIDE FOR REDUCING LATERAL TAPE MOVEMENT	)
Examiner:	Rivera, William A.	)
Attorney Docket:	Q00-1027-US1 / 11198.70	)

DECLARATION OF KEN HANSCOM PURSUANT TO 37 C.F.R. 1.131

I, Ken Hanscom, declare as follows:

1. I am the sole inventor of the present invention that is encompassed within U.S. Patent Application Serial No. 09/930,120 (the "Present Application"). Prior to October 10, 2000, I reduced to practice in the United States one or more embodiments of the concepts included in the Present Application, as set forth below.

2. Among the concepts which I reduced to practice prior to October 10, 2000, are one or more embodiments of:

a. A guide assembly for reducing lateral movement of a storage tape in a tape drive, the guide assembly comprising a rotatable first roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove length in a direction substantially along the circumference, and a groove bottom that is substantially linear in a direction along the groove length;

b. A guide assembly for reducing lateral movement of a magnetic tape in a tape drive, the guide assembly comprising a first roller including a perimeter

surface, a circumference, a longitudinal axis and a plurality of discontinuous grooves disposed into the perimeter surface, one of the grooves having a groove depth that varies in a direction along a length of the groove;

c. A guide assembly for reducing lateral movement of a magnetic tape of a tape drive, the guide assembly comprising a first roller having a perimeter surface, a circumference and a plurality of spaced-apart discontinuous grooves disposed into the perimeter surface, each groove being positioned substantially parallel to the circumference of the roller, each groove having (i) a groove depth that varies between approximately zero inches and 0.02 inches, (ii) a groove length of between approximately 0.1 inches and 0.3 inches, and (iii) a groove width of between approximately 0.005 inches and 0.015 inches;

d. A method of manufacturing a tape roller of a guide assembly for a tape drive, the method comprising the steps of providing a rotatable roller having a circumference and a perimeter surface and forming a groove into the perimeter surface so that the groove is tapered to have a groove depth that varies in a direction along a length of the groove;

e. A method of manufacturing a roller for use in a guide assembly of a tape drive, the method comprising the steps of providing a roller portion having a circumference and a perimeter surface and forming a groove into the perimeter surface so that the groove has a groove depth that varies along the length of the groove;

f. A method of reducing lateral tape motion of a storage tape adapted for use in a tape drive, the method comprising the step of providing a tape drive having a guide assembly that includes a rotatable first roller having a perimeter surface, a circumference, and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference;

g. A guide assembly for reducing lateral movement of a storage tape in a tape drive, the guide assembly comprising a first roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference, and a groove depth that varies between approximately zero

inches and 0.02 inches along the length of the groove; and

h. A method of manufacturing a tape drive, the method comprising the step of rotatably mounting a tape roller to a drive housing of the tape drive, the tape roller including a groove having a groove depth that varies over a length of the groove.

3. As evidence of the reduction to practice of these embodiments prior to October 10, 2000, attached hereto as Exhibit "A" is a true and correct copy of a photographic image of a tape roller having one or more of the features identified above that I reduced to practice prior to October 10, 2000.

4. As further evidence of the conception of these embodiments prior to October 10, 2000, attached hereto as Exhibit "B" is a true and correct copy of a document that I originally created prior to October 10, 2000, that memorializes and describes the reduction to practice of at least one embodiment of the relevant portion of the invention described above. Portions of the document that are not relevant for purposes of this Declaration have been redacted.

I declare that the facts set forth in this declaration are true; and that all statements made on my own knowledge are true and all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of the application or any patent issuing therefrom.

Executed on this 5th day of April, 2007, in Bellington, WV.

KEN HANSCOM

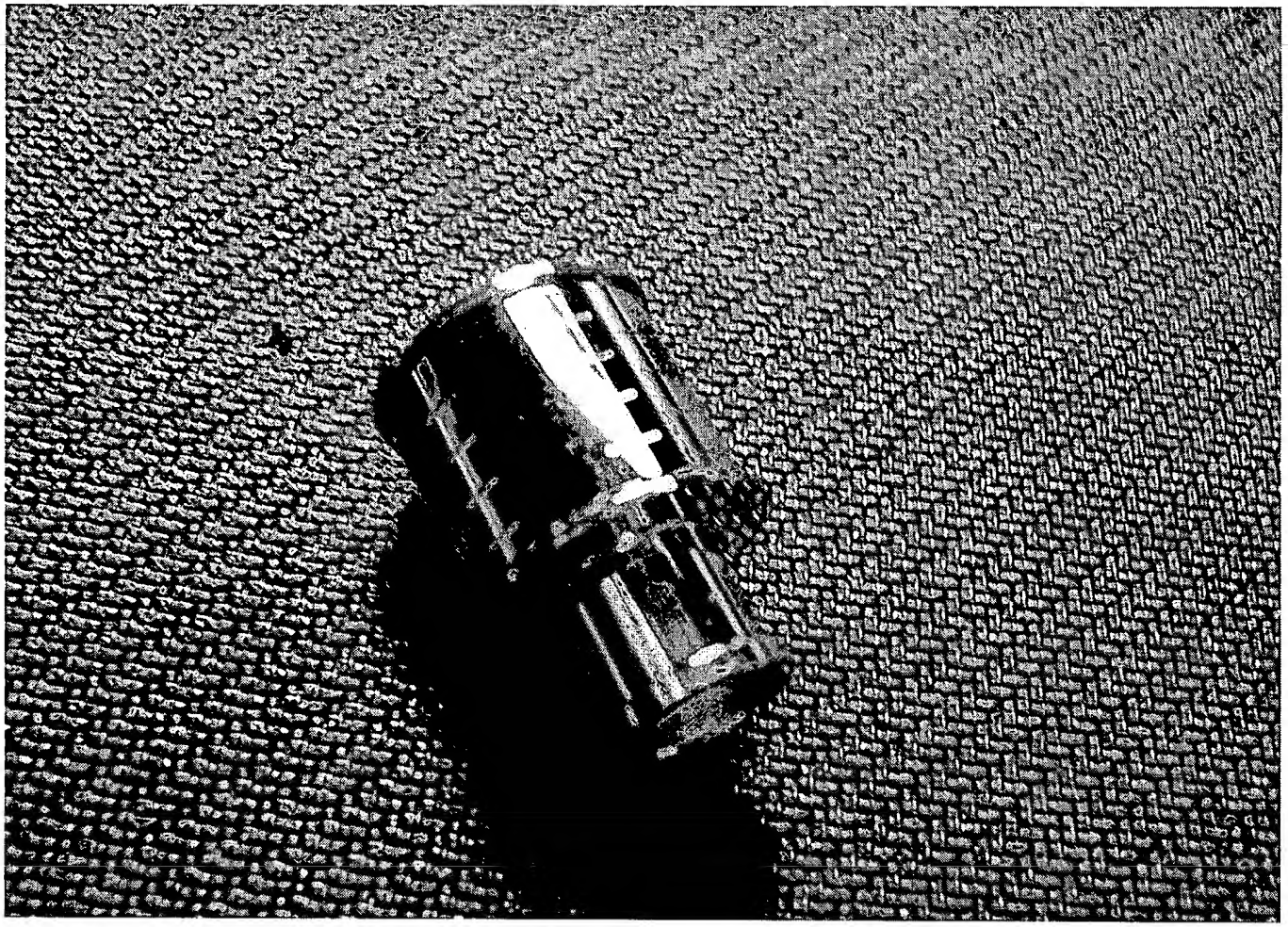


EXHIBIT "A"

Grooved Roller

Disclosure Definitions and Discussions

Print Through- is the condition which occurs when a discontinuity or artifact, in the surface over which the tape travels, imparts a corresponding pattern or creates a flaw on the tape. If the condition is severe enough data loss will occur. Operations such as tape reversal, read write retries, power failure recoveries, and environmental conditions tend to exacerbate the effect. (One Bit of data is stored on a tape when approx. 8 particles of magnetic media material –usually Fe 02- are coerced to accept a magnetic field effect charge. This charge must then be detected by the Read element. Any perturbation which alters the strength of this field, or changes the proximity of the media to the read element compromises the successful detection of the stored charge.

LTM- Lateral Tape Motion or Movement- is any deviation from the perfect plane path of the tape as it travels from the cartridge to take-up reel. Manifestation of LTM may be transient and of short duration or longer and more pronounced. Although our concern is primarily with the vertical component, the horizontal resultant is also observed. Contributions to LTM are:

1. Any planar misalignment of the Cartridge, Rollers, and or Take-up Reel. Perpendicularity must be minimal in all directions. All flange heights must be the same and parallel to a specified Datum.
2. Any surface condition or anomaly, intentional or accidental, which tends to inflict a deviation from the perfect path. Tilt Head and Tachometer Roller design are intentional, while contamination vibration are accidental.

DC Shift- Directional Change Shift occurs when the Tape direction is changed from forward to reverse and reverse to forward. DC shift is measured during LTM testing and is caused by generally the same conditions as outlined in LTM. DC shift though tends to be of instantaneous inception and remain for a longer duration. The result is that a track of written Data in one direction is not at the same precise location (height in reference to a Datum) when measured in the other direction.

Discussion-

Why does a decrease in wrap angle increase bubble formation?

Actually a decrease in the wrap angle does not change the laminar flow dynamics. The effects are more apparent because of the total surface area contacting the roller. If the friction to the tape necessary to spin the roller is equal to the area of tape contact minus the area of the grooves, then the less the contact area the less the friction (assuming constant tape tension). So, reduced surface area, because of reduced wrap angle, results in the decreased friction and increase slippage potential. The concept of the grooves is to increase the friction of any given surface area by reducing the amount of entrapped air between the tape and the roller surface.

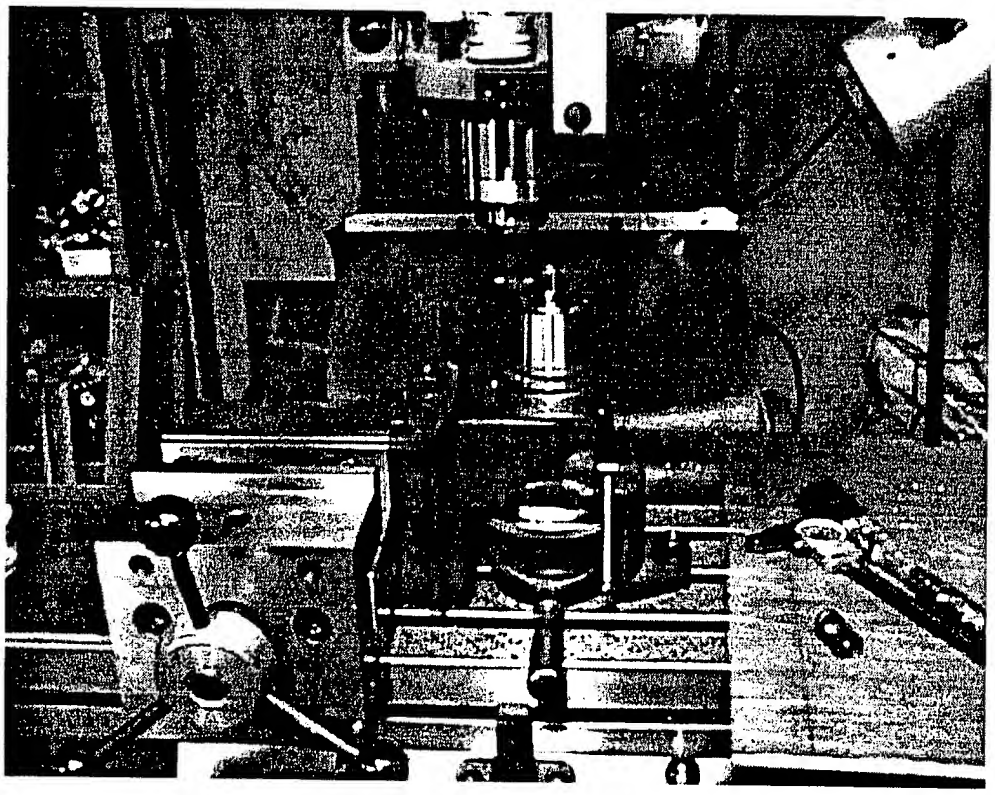
EXHIBIT "B"

Extension of Groove Design to facilitate application to later Tape Path modification.

The concentric groove concept may be adapted to any configuration roller design as long as the pattern does not create print through or tape damage. This design may be implemented on all of the rollers in order to provide a more stable tape platform. The length of the groove may be up to the circumference minus the wrap angle contact distance. The depth may be from .002" to .015". The width of the groove may be from .003" to .100".

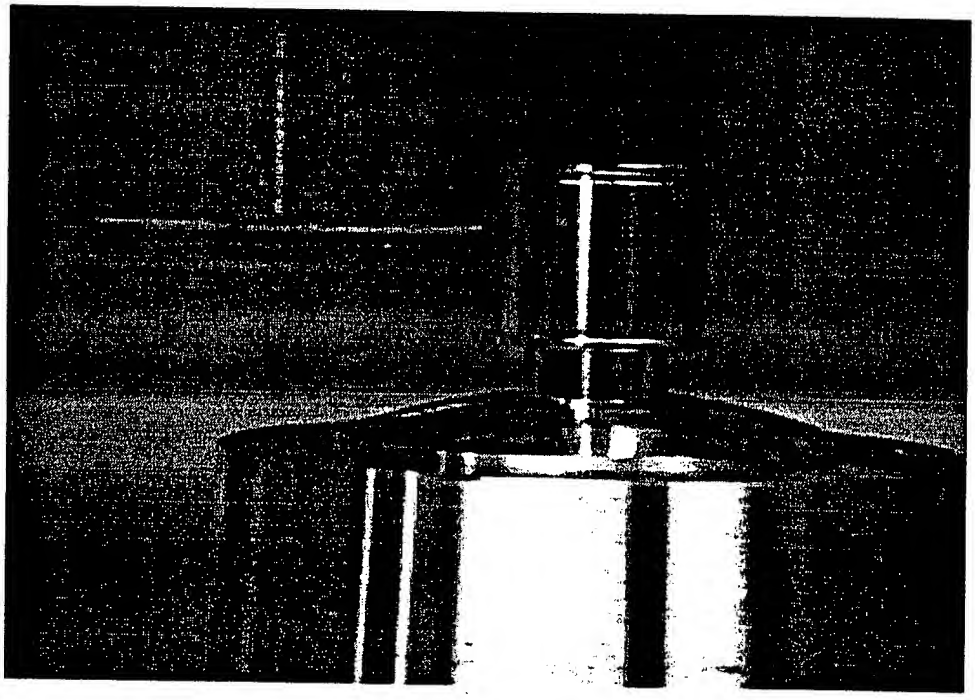
Manufacture-

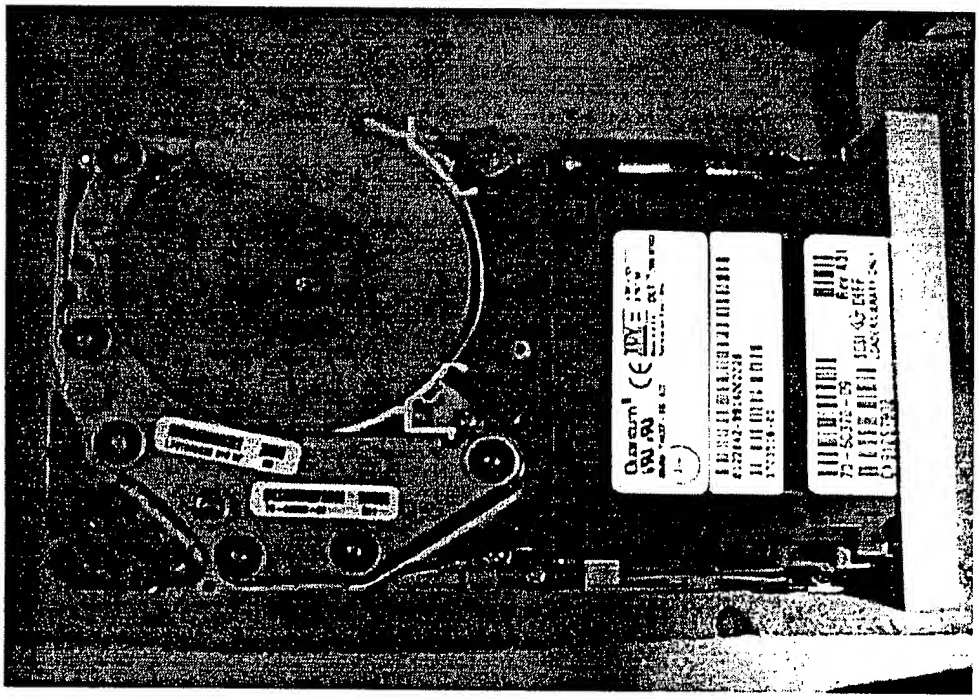
The new roller design was fabricated on a CNC Vertical Milling Machine. The roller was held vertically in a Hariq Head indexing fixture. The cut was performed with a .006" jewelers slitting saw. The saw was held on an arbor so that the cutting plane was perpendicular to the roller vertical axis. The cutting tool was then passed tangentially to the roller surface at a depth of .0055".



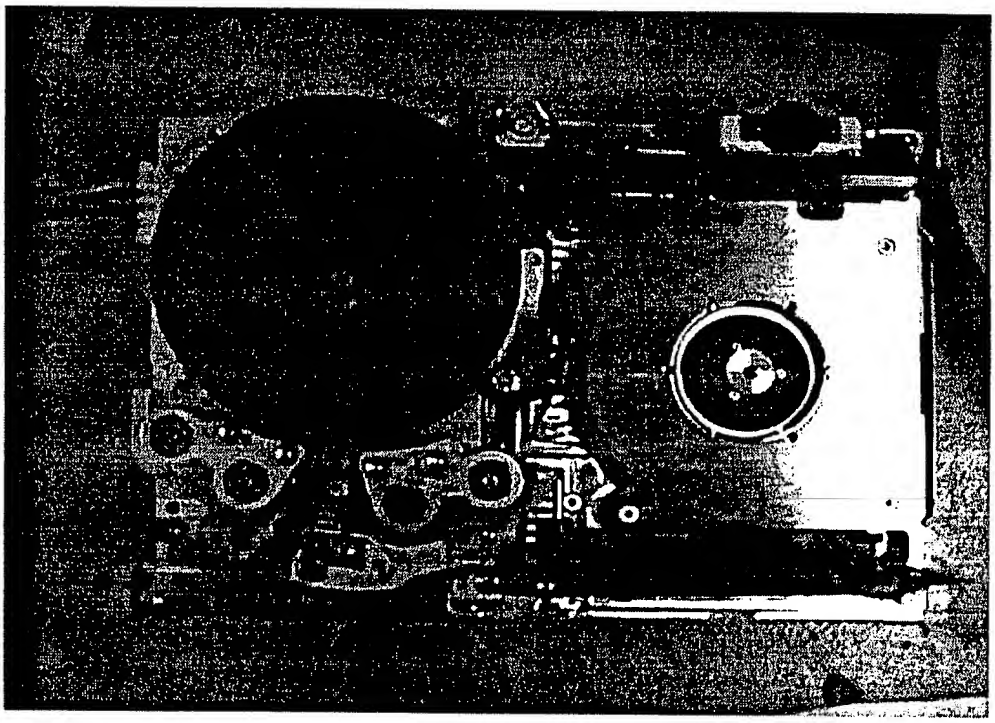
Milling Machine

Slitting Saw and Roller





7000 Drive



SDLT 1 Drive